

PATENT SPECIFICATION



Convention Date (Germany): Feb. 26, 1931.

396,471

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Complete Accepted: Aug. 10, 1933.

COMPLETE SPECIFICATION.

Roofs for Motor Cars and other Vehicles.

I, OTTO BRUPBACHER, of Militärstrasse 10-12, Luzerne, Switzerland, a Swiss Citizen, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention relates to that kind of operable roof for motor cars and other vehicles which comprises cross pieces which are slidable along the body of the car and support a flexible covering which folds in concertina fashion when the cross pieces are slid together.

According to my invention the cross pieces are so inter-connected and attached to the covering that when they are slid together the covering is positively laid in a definite number of folds.

An inner covering may also be attached to the inter-connected cross pieces in such a manner that when the cross pieces are slid together, the inner covering is also positively laid in a definite number of folds.

The inter-connected cross pieces and covering or coverings may be arranged to slide together and fold in either a forward or a backward direction at will.

This arrangement makes it possible either to open the roof at the front or nearer the back.

Above the grooves in which the cross pieces slide, there may be a groove or gutter for preventing the passage of water under the covering into the vehicle.

The cross pieces may be automatically variable in length to facilitate sliding when pushed together.

The provision of cross pieces which are automatically variable in length enables them to be employed for cars in which the roof is narrower in front than behind.

A method of slidably mounting the cross pieces in grooves by means of rollers, consists in providing the rollers with peripheral grooves adapted to engage and run between inwardly turned flanges provided on U section rails.

Where automatically variable cross-pieces are provided they may each be in three telescopic parts, a helical spring being provided between the middle part

and each end part to ensure that the middle part always remains in the middle position.

All of the hereinbefore specified features are shown in the accompanying drawings, wherein—

Figure 1 is a section in elevation, showing how the front part of the roof and the back can be moved separately.

Figure 2 is a section at line A—A of Figure 1.

Figure 3 is a section at line B—B of Figure 1.

Figure 4 is an elevation, partly in section, showing the roof slid forward and the rear part folded back, partial section.

Figure 5 is a fragmentary view in elevation, partly in section, and illustrates a modified detail.

Figure 6 is an elevation, partly in section, showing how the front part of the roof can be pushed together with the back part of the roof and folded back.

Figure 7 is an elevation partly in section, showing the roof opened.

Figure 8 is a detached view in transverse section showing the sliding part of the roof.

Figures 9, 10 and 11 show in sectional elevation, side view and plan respectively, the fitting of rollers on a cross-piece.

Figure 12 is a detached plan view in section showing the fitting of a roller which runs on balls.

Figure 13 shows in plan view a car-roof which tapers towards the front.

Figure 14 is a side view, partly in section of a crosspiece of variable length. The dotted portions of Figure 14 show a crosspiece with a turned down end.

Figure 15 is a plan view of a part of the roof with a cross-piece, and Figure 16 a transverse section of the cross piece.

Figure 17 shows in sectional elevation the left half of the cross piece, with guide. The dotted portion of this Figure indicates a raised cross piece.

Figure 18 is a plan view, partly in section of the cross piece shown in Figure 17, and

Figure 19 is a transverse section thereof.

[Price 1/-]

Figure 20 is a plan view of a roof, stripped of its covering and having main and subsidiary cross pieces.

Figure 21 a transverse section of two main cross pieces.

Figure 22 a plan view of the same, and

Figure 23 the transverse section of two main cross pieces pushed together.

Details of Figures 1 to 7.

1 is the under part of the car body.

2 is a separating joint (mortise) in the roofing. 3 are cross pieces which have a covering 5 over them and a covering 6 underneath them of cloth or such like material. 7 and 8 are over and under coverings of the back part of the roof, which it is most suitable should consist of leather. 9 is an angle piece, which can turn over at 10 and is hinged onto the under part of the roof. 11 is a spar which is fitted on both sides between the coverings 7 and 8 of the back part of the roof. 12 are the "hinged stays", which consist of two parts hinged together, of which the lower one is hinged onto the body of the car at 13 and the upper one is hinged onto the angle piece 9 at 14.

15 are the side windows of the car and 20 is the wind screen. The cross pieces 3 have at both sides tenons, which run in grooves 19 of the body frame work.

In the example shown, the front roof and the back part of the roof can either be opened separately or both together.

The front roof is opened by pushing the cross pieces 3 forward until they lie close together, when the coverings 5 and 6 fold together upwards.

To open the back part of the roof it is sufficient to fold together one of the two stays. As the two are connected by a rod at 13, both stays, always move together. The opened car is shown in Figure 4, sheet 1.

The coverings 7 and 8 of the back part of the roof, when folded, form the folds 27.

If the part marked 21 is considered too high, it can (as shown in Figure 5, sheet 1) be turned down backwards by means of a hinge 24.

The frame work of the roof can also be so constructed that, after the folding back of the back part the portion of the frame work drawn on dotted lines and numbered 22 and 23 remains standing. In the example shown in Figures 1 to 4, sheet 1, the cross piece 4 is firmly attached to the roof frame.

In Figures 6 and 7, sheet 2, the covering 5' represents the continuation of covering 5 and covering 6' represents the continuation of covering 6. Cross pieces 4, 3, 25 and 26 can be pushed together backwards in the grooves 19.

When this has been done, the back part of the roof is folded back as in the first example. The separating joint (mortise) of the roof frame is again at 2. In order that the cross pieces 3, 4, 25 and 26 may not stand up too high, when the back of the roof is standing up with these cross pieces, that is to say with the front part of the roof, cross pieces 3 and 4 again can fold backwards. Figure 7 shows the car roof opened in this way.

In both ways described a roof can be entirely or partly opened and closed with great celerity and precision. Whether open or closed the car has the same elegant appearance.

Such roofs can be fitted to any cars, short or long.

Details of Figures 8 to 12.

3 is one of the cross pieces, to which are fastened the top covering 5 and the underneath covering 6. At each end of the cross piece is a metal socket 30, which is fixed on the cross piece by the pins 45.

The socket 30 has a flat extension to which by means of the axle 38 the horizontally running roller 39 and by means of the axle 40 the vertically running roller 41 are fastened. The roller 39 runs between the vertical parts 32 and 33 of the rail 31. The rail 31 has a part projecting outwards which among other things serves to fasten rail 31 to the part of the roof marked 19. The rail 31 has a second projection at the top which is made to form a gutter 35. When the roof covering 5 is stretched lengthways over the car, its edge lies on 19 at 51 and renders the roof covering 5 waterproof. The rollers 41 have the object of reducing the friction which comes from the weight of the sliding part of the roof or is caused by other vertically working forces, while the rollers 39 have the object of reducing the friction which might arise from any tendency of the cross pieces not to run evenly when pushed in the direction of the length of the car.

Figure 12 shows an arrangement of rollers which run on balls instead of being ordinary rollers. 37 is attached to cross piece 3, 40 is an axle by means of which ring 49 is fastened to 37. 51 is the runner (running ring) of the roller and the balls are numbered 50. Rollers 39 and 41 can be made as in Figure 12.

Details of Figures 13 to 16.

3 is a cross piece which, for example can in the main be made of wood. 19 is the roof frame of the car, and 32 and 33 are parts of a rail for the horizontal roller 39 and the vertical roller 41. The part on which the rollers are fastened is marked 37. This part is flat where it is in the guide rail for the rollers and has

outside the rail a round portion 50, which is pinned to the tube 52 by a pin 51. This tube 52 fits exactly into a tube 53 which is attached to the middle part of cross piece 3 by pin 54. Through 52 goes a pin 56 which runs in two slots in 53 which are marked 55.

When the ends of the crosspiece are bent downwards, as shown by the dotted lines Figure 14, each of the roller holders 37 is connected with tube 52 by a bent intermediate piece 60.

The way in which the cross pieces change in length is as follows: When the crosspiece 3 (see also Figure 13) is pushed in the direction of the length of the car, the tube 52, according to whether the cross piece is further forward or further back on the car roof, goes deeper or less deep into tube 53.

This takes place at both ends of each of the cross pieces.

Tubes 52 and 53 are thus pinned to each other so far as axial movement is concerned, in order that the cross piece 3 may not be able to twist round in relation to the roof edge. The pinning also prevents the tube 52 from slipping out of the tube 53.

The device functions in the same way whether the cross pieces are straight or curved.

Owing to the pinning between the tubes 52 and 53, and also to the fact that two vertical rollers 41 are fitted at each end of the cross pieces, it is impossible for the cross piece 3 to twist.

Details of Figures 17 to 19.

3 is the cross piece, in the middle part of which at both ends a socket 63, incapable of turning, is inserted. Into this socket goes the round iron piece 62. In order that no turning can take place between the round iron piece and the socket, that is to say the middle part of the cross piece, the socket and round iron piece are transfixed by a pin 56, which is fixed in the round iron piece, and can move to and fro in the slot 61 in 63. On the left a flat iron piece 66 is rivetted onto the round iron piece 62, which on both sides of 62 carries a roller axle 67. By means of the nuts 65 a ball bearing roller 41 is fastened to each axle 67. These rollers run between the bent over edges of a U iron rail 68, between the edges 69. 35 is an extension of the rail, which as above serves to keep waterproof the top covering of the roof. Between the round iron piece and the middle part of the cross piece is inserted a helical spring 64.

When the cross piece has bent over ends (see dotted lines), the part 66 can have an extension upwards to which again

the round iron piece 62 is rivetted.

The manner in which the device works is clear without further explanation. It is distinguished by great simplicity. The ball bearing rollers 41 take a vertical pressure, and at the same time the horizontal pressure also, which comes from the springs, when the rails 68 do not run parallel, is taken up by the balls in the rollers, so that the cross piece 3 travels easily along the rails 68, while its middle part remains always midway between the rails 68.

When the rails 68 run parallel, the spring 64 can in each case be omitted and the round iron piece 62 can then be pinned direct to the middle part of the cross piece.

When the rails 68 converge somewhat and the springs 64 thus come into use, the two helical springs in each cross piece must of course be of exactly equal strength or they will not attain their object.

Details of Figures 20 to 23.

In Figures 20, 21, 22, 23 the cross pieces are again numbered 3 and the roof frame 19. Between every two cross piece 3 is an auxiliary cross piece 70, which on both sides is connected with the cross piece 3 by the bands 72 and 73 and the hinge parts 74. The auxiliary cross pieces 70 are flattened at both ends and are of such a length that, when the roof is spread, the flat ends 78 of the auxiliary cross pieces 70 rest on the roof frame. In order that the cross pieces 70 may never get under the cross pieces 3, the hinges 75 are provided at 80 with a rabbet. 5 is the top and 6 the under roof cloth. 71 is a vertical connection, which can take the form of a band of fabric for example, between the cross pieces 70 and the under roof cloth 6.

When the two cross pieces (see Figure 20) are pushed together, the upper roof cover falls fairly flat onto the roof frame 19, because the bands 72 and 73, which connect the cross piece 3 with the auxiliary cross pieces 70, are of unequal length. If 72 and 73 were the same length, the roof fold when the cross pieces are pushed together would stand erect.

The cross pieces 70 together with the bands 72 and 73 ensure a positive and neat folding of the roof covering into definite folds, and at the same time provide a connection between the cross pieces 3. 41 are here again the rollers of the cross pieces, which run in the rail groove 69.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is

to be performed, I declare that what I claim is:—

1. A motor car or other vehicle roof of the hereinbefore specified kind, wherein the cross pieces are so inter-connected and attached to the covering that when they are slid together the covering is positively laid in a definite number of folds.
2. A roof as claimed in claim 1 wherein an inner covering is also attached to the inter-connected cross pieces in such a manner that when the cross pieces are slid together the inner covering is also positively laid in a number of definite folds.
3. A roof as claimed in claims 1 or 2, wherein the cross pieces and covering or coverings are arranged to slide together and fold in either a forward or backward direction at will.
4. A roof as claimed in claim 1, characterized by a groove or gutter provided above grooves in which the cross pieces slide, for the purpose of preventing passage of water under the covering into the vehicle.
5. A roof according to claim 1, wherein the cross pieces are automatically variable in length to facilitate sliding when pushed together.
6. In a roof according to claim 1, a method of slidably mounting the cross pieces by means of rollers in grooves,

characterized by the provision of peripheral grooves in the rollers to engage and run between inwardly turned flanges provided on U section rails.

7. A roof according to claim 5, wherein each cross piece is in three telescopic parts and a helical spring is provided between the middle part and each end part to ensure that the middle part always remains in mid position.

8. A roof according to claim 1, wherein the cross pieces comprise main cross pieces having between them auxiliary cross pieces which are connected with the main cross pieces by hinged bands of unequal length and means are provided whereby these auxiliary cross pieces can never be lower than the main cross pieces, and these auxiliary cross pieces are connected to an inner cover.

9. A roof according to claim 8 wherein, the means of preventing the auxiliary cross pieces from falling lower than the main cross pieces consists of a rabbet on the hinges of the auxiliary cross pieces themselves.

Dated this 25th day of February, 1932.

For the Applicant,

F. BOSSHARDT,

Chartered Patent Agent,

31, Regent House, Cannon Street,
Manchester.

Fig. 1.

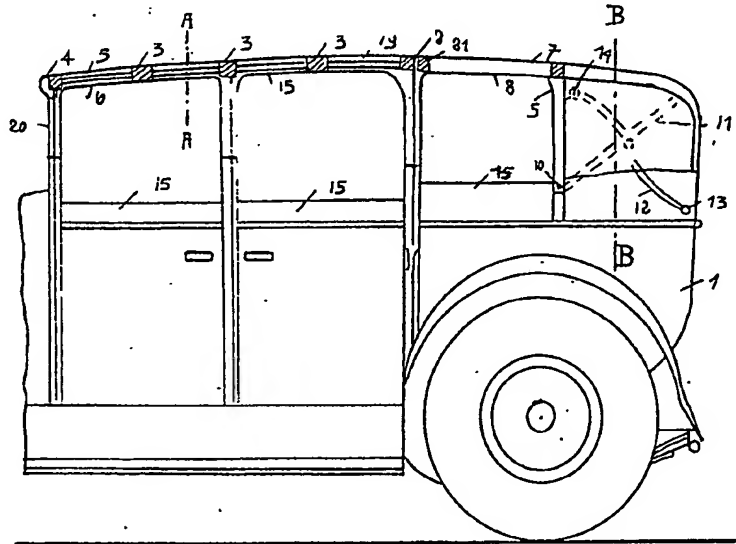


Fig. 2.

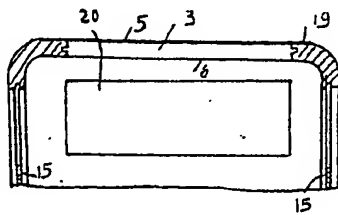


Fig. 3.

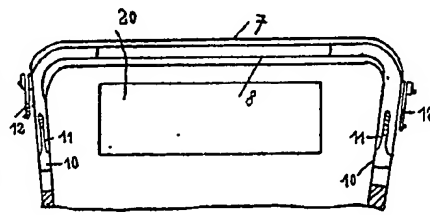


Fig. 4.

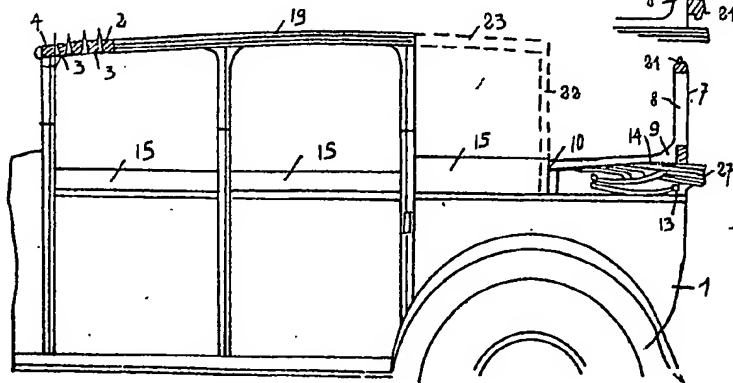
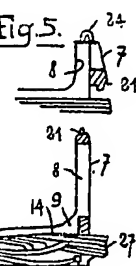


Fig. 5.



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Fig. 6.

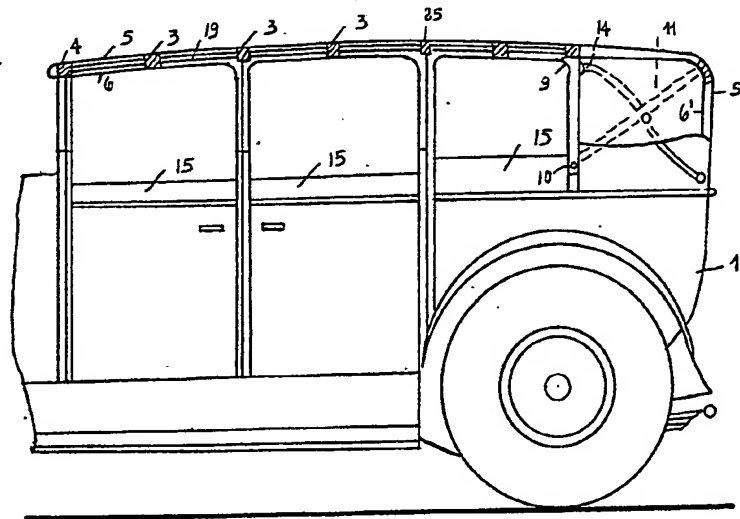


Fig. 7.

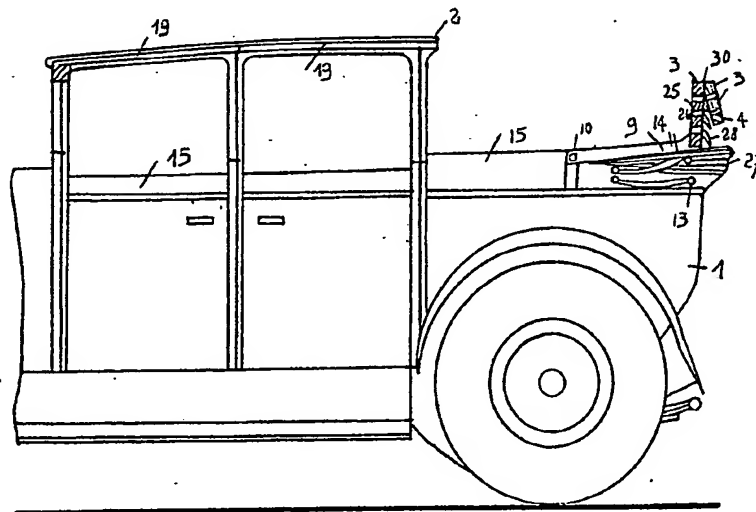


Fig. 1.

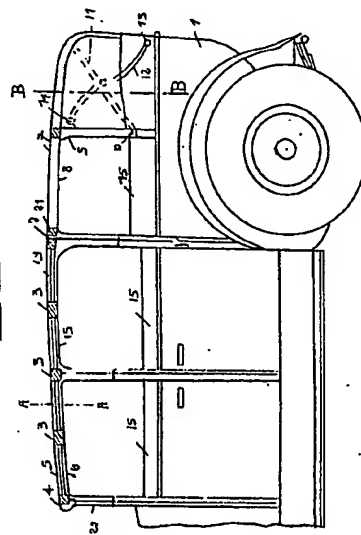


Fig. 2.

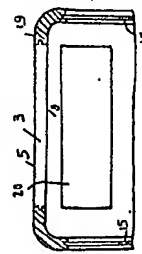


Fig. 3.

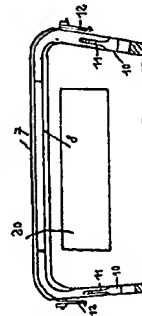


Fig. 4.

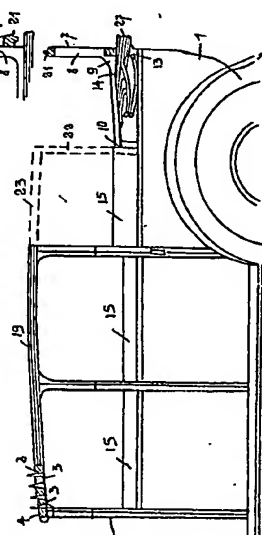


Fig. 5.

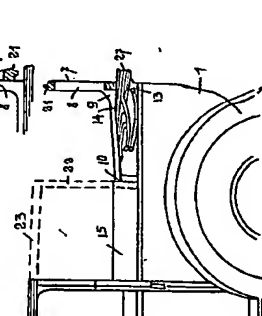


Fig. 6.

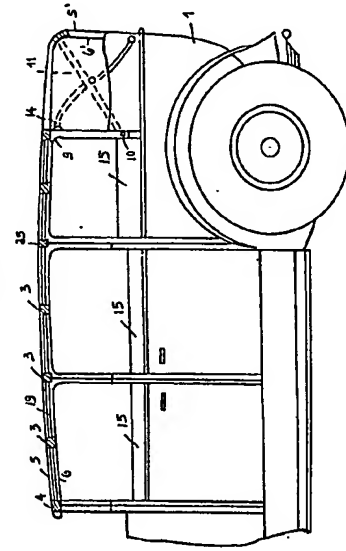
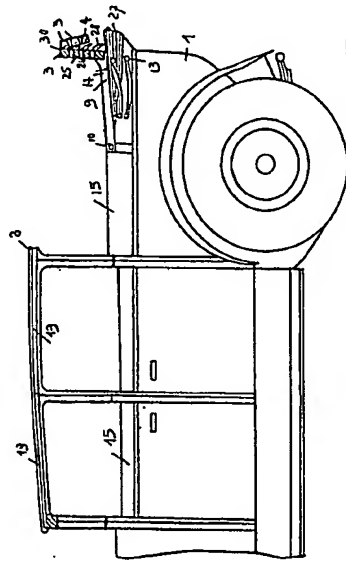


Fig. 7.



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Fig. 8.

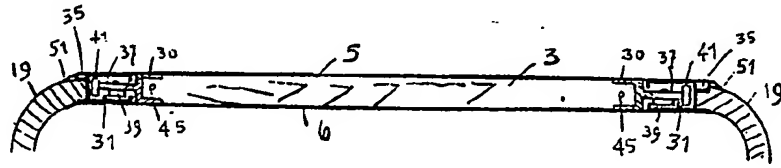


Fig. 9.

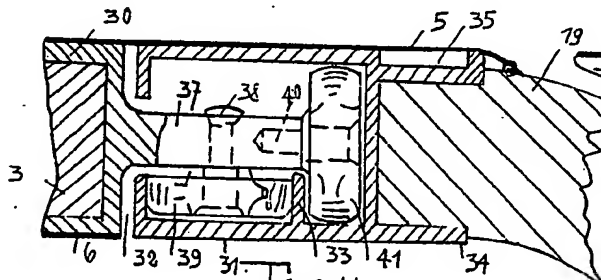


Fig. 10.

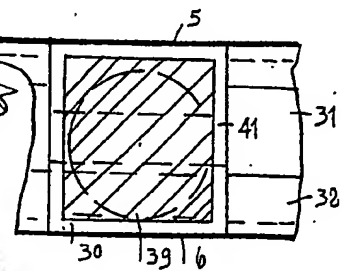


Fig. 11.

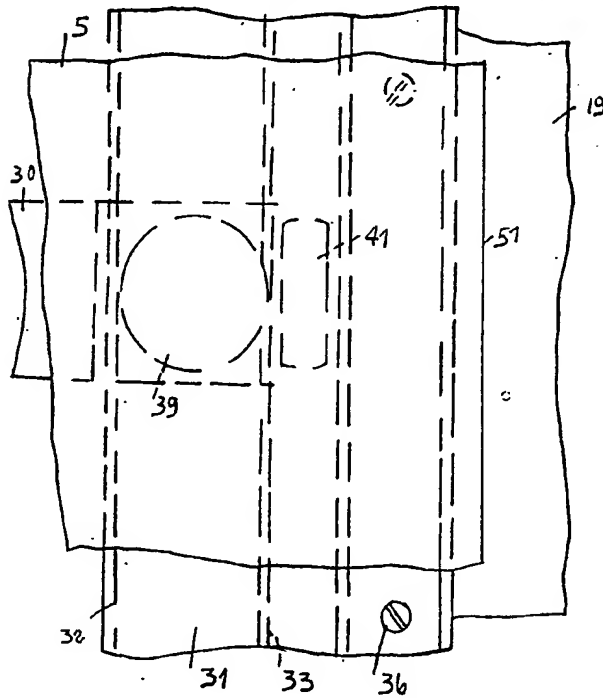
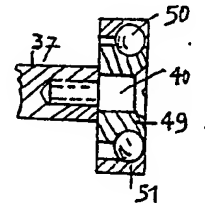


Fig. 12.



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Fig. 13

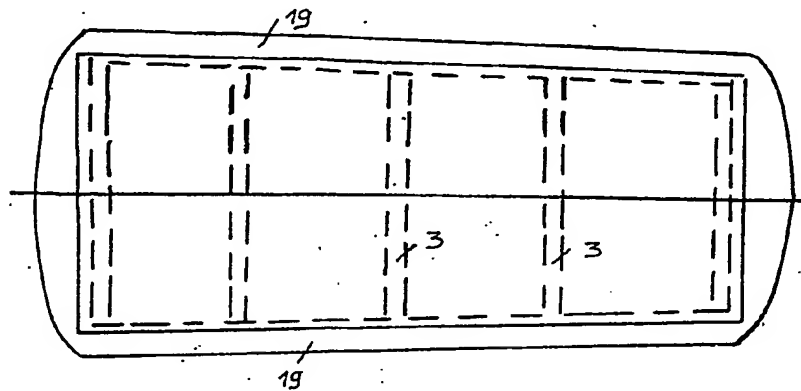


Fig. 14.

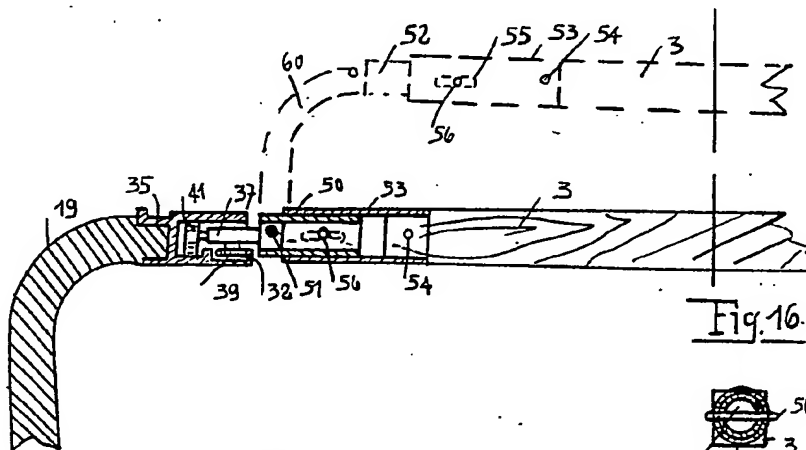
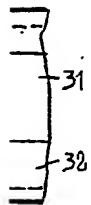


Fig. 16.

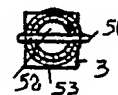


Fig. 15.

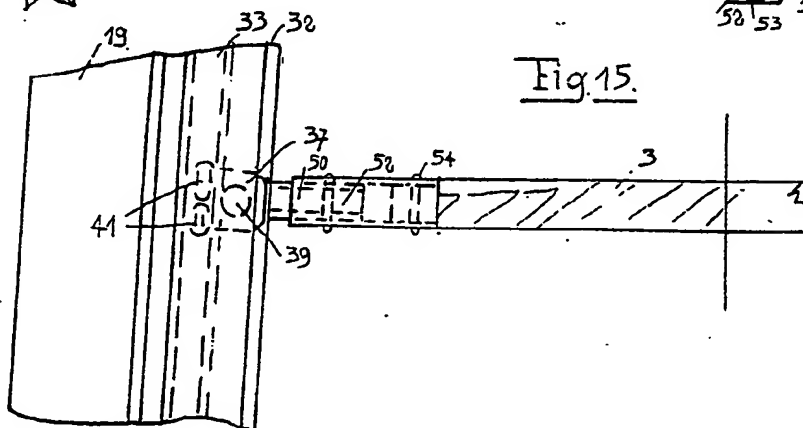


Fig. 8.



Fig. 9.

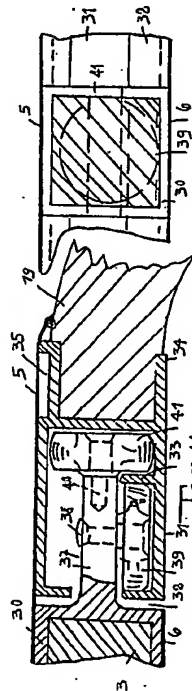


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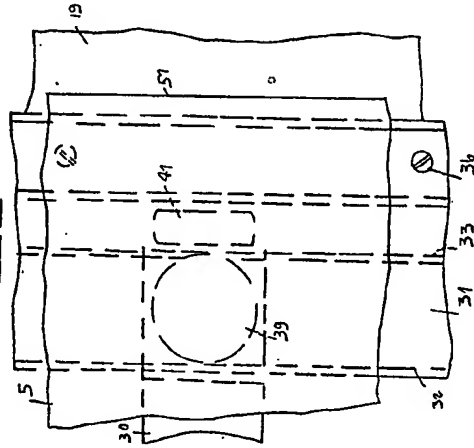


Fig. 12.

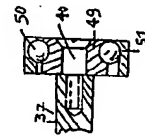


Fig. 13.

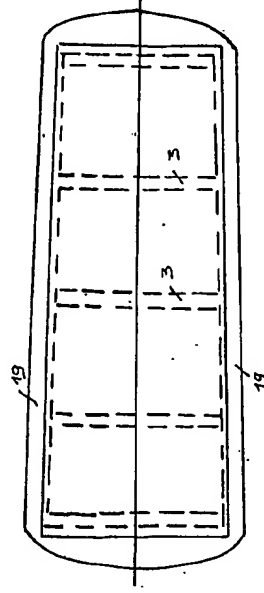


Fig. 14.

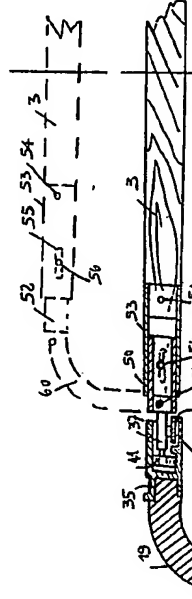
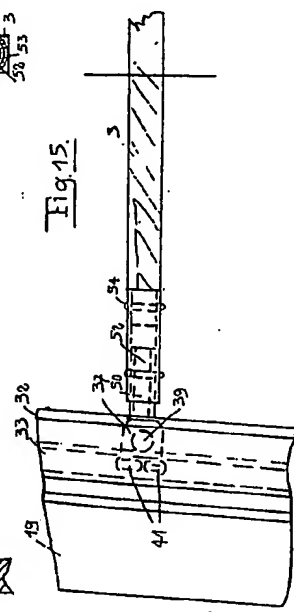


Fig. 16.



Fig. 15.



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Fig. 17.

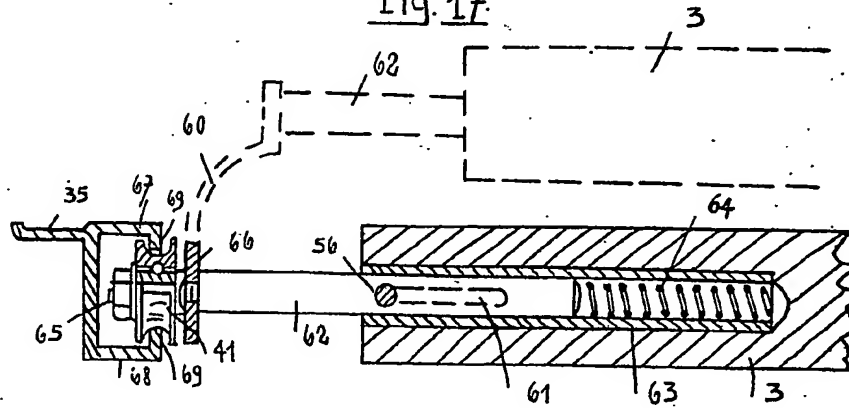


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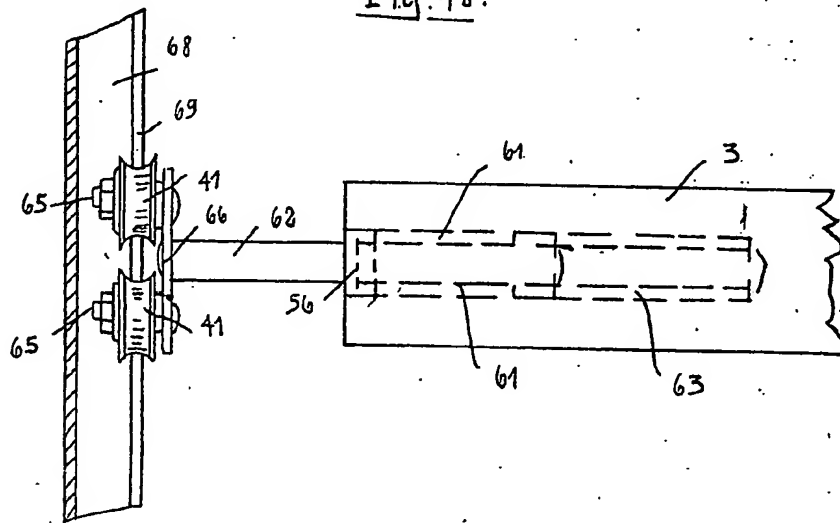
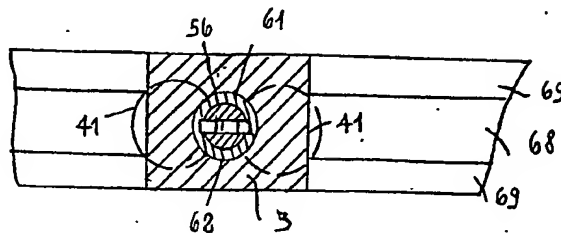


Fig. 19.



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Fig. 20.

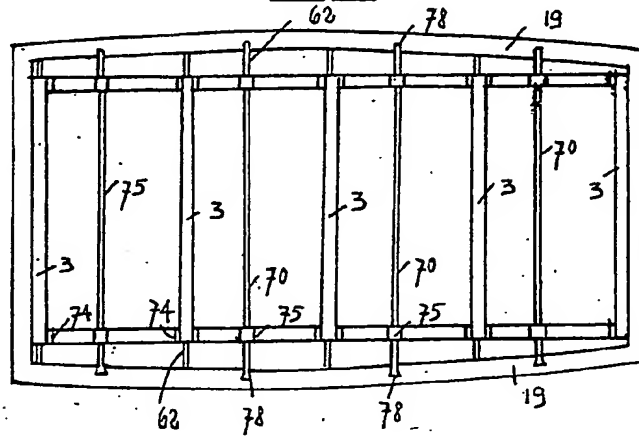


Fig. 21.

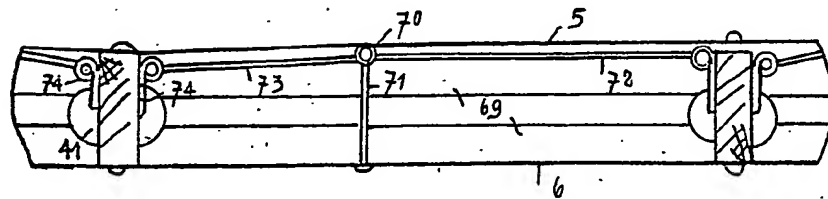


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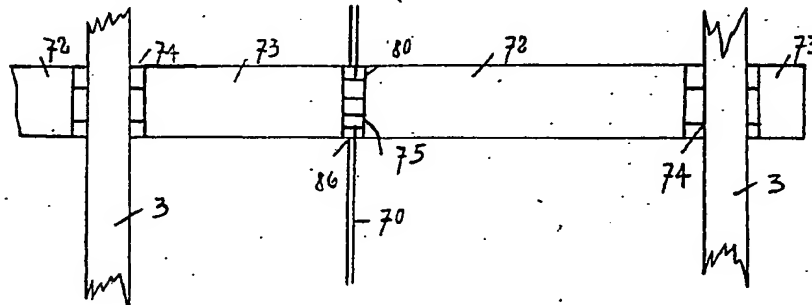
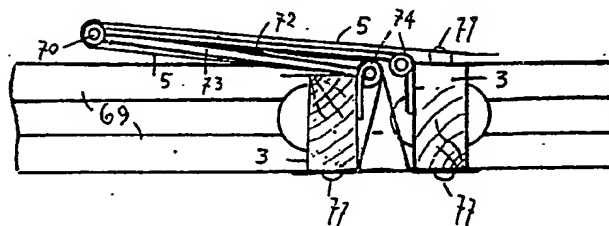


Fig. 23.



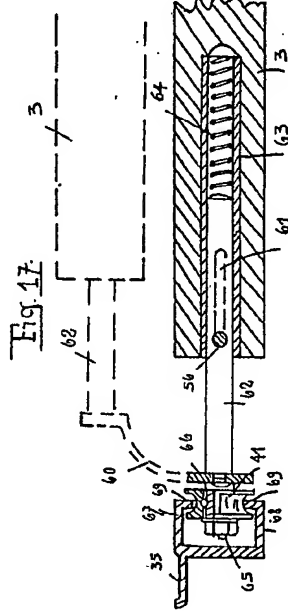


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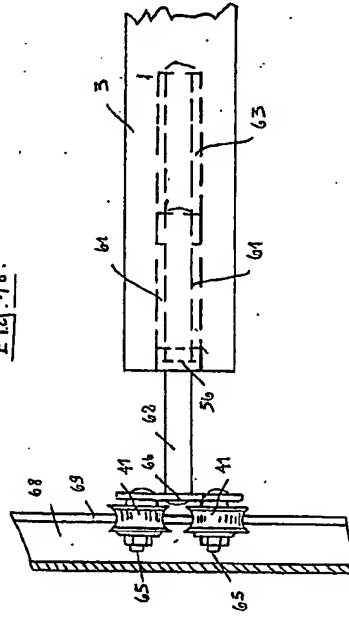


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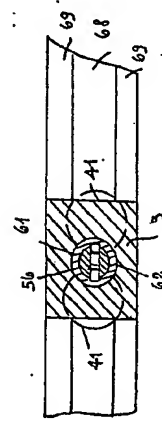


Fig. 20.

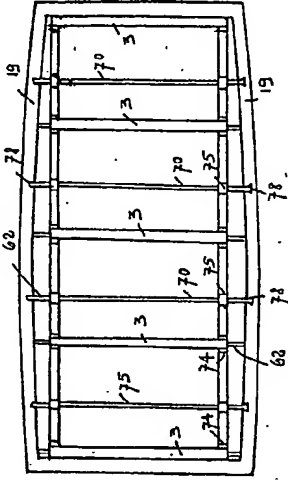


Fig. 21.

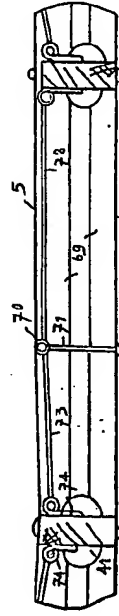


Fig. 22.

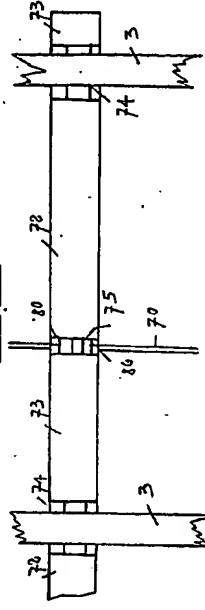
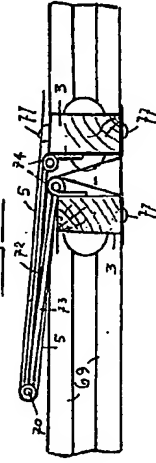


Fig. 23.



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